Concrete-Representational-Abstract Instructional Approach

What Is the Concrete-Representational-Abstract (CRA) Instructional Approach?

CRA is an intervention for mathematics instruction that research suggests can enhance the mathematics performance of students with learning disabilities. It is a three-part instructional strategy, with each part building on the previous instruction to promote student learning and retention and to address conceptual knowledge.

The CRA instructional sequence consists of three stages: concrete, representation, and abstract:

• *Concrete.* In the concrete stage, the teacher begins Instruction by modeling each mathematical concept with concrete materials (e.g., red and yellow chips, cubes, base ten blocks, pattern blocks, fraction bars, and geometric figures).

• *Representational.* In this stage, the teacher transforms the concrete model into a representational (semi-concrete) level, which may involve drawing pictures; using circles, dots, and tallies; or using stamps to imprint pictures for counting.

• *Abstract.* At this stage, the teacher models the mathematics concept at a symbolic level, using only numbers, notation, and mathematical symbols to represent the number of circles or groups of circles. The teacher uses operation symbols (+, –,×, ÷) to indicate addition, multiplication, or division.

Concrete. The "doing" stage using concrete objects to model problems

Representational. The "seeing" stage using representations of the objects to model problems

Abstract. The "symbolic" stage using abstract symbols to model problems

CRA supports understanding underlying mathematical concepts before learning "rules," that is, moving from a concrete model of chips or blocks for multiplication to an abstract representation such as 4 x 3 = 12.

Research-based studies show that students who use concrete materials develop more precise and more comprehensive mental representations, often show more motivation and on-task behavior, understand mathematical ideas, and better apply these ideas to life situations (Harrison & Harrison, 1986; Suydam & Higgins, 1977). Some mathematical concepts for which structured concrete materials work well as a foundation to develop understanding of concepts are early number relations, place value, computation, fractions, decimals, measurement, geometry, money, percentage, number bases, word problems, probability and statistics.